

RAFIE et al. -- 09/764,202  
Client/Matter: 011765-0302386

IN THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1.-24. (Canceled)

25. (Original) A carrier phase recovery system comprising:

a first equalizer configured to equalize a present burst of data using equalizer weights from a previous burst of pilot symbols and data symbols, the present burst of data including pilot symbols and data symbols;

a carrier phase recovery unit which recovers phase for the present burst of data using the pilot symbols of the present burst;

a mixer combining a delayed version of the present burst and the recovered phase to produce a phase-error compensated signal; and

a second adaptive equalizer which equalizes the phase-error compensated signal to produce an equalized output signal and provides next burst equalizer weights to a memory to be timely applied to the first equalizer for equalizing a next burst of data on the same link.

26. (Original) The carrier phase recovery system of claim 25 further comprising:

a memory circuit coupled to the second equalizer to store the next burst equalizer weights.

27. (Original) The carrier phase recovery system of claim 25 wherein the carrier phase recovery unit comprises:

a coarse carrier phase estimation circuit; and

a fine carrier phase estimation circuit to produce the recovered phase.

28. (Original) The carrier phase recovery system of claim 27 wherein the coarse carrier phase estimation circuit is configured to produce a coarse estimate of the phase for the present burst of data using the pilot symbols of the present burst of data.

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29. (Original) The carrier phase recovery system of claim 28 wherein the fine carrier phase estimation circuit is coupled to the coarse carrier phase estimation circuit to produce the recovered phase using the coarse estimate of the phase and at least some of the data.
30. (Original) The carrier phase recovery system of claim 29 wherein the fine carrier phase estimation circuit is coupled to the equalizer to receive an initial equalized signal.
31. (Original) The carrier phase recovery system of claim 30 wherein the coarse carrier phase estimation circuit is coupled to the equalizer to receive the initial equalized signal.
32. (Original) The carrier phase recovery system of claim 27 wherein the fine carrier phase estimation circuit comprises a de-rotating circuit coupled to the equalizer to receive an initial equalized signal to remove estimated coarse carrier phase from the initial equalized signal responsive to an estimate signal from the coarse carrier phase estimation circuit.
33. (Original) The carrier phase recovery system of claim 32 wherein the de-rotating circuit is coupled to the coarse carrier phase estimation circuit to receive a phasor signal as the estimate signal.
34. (Original) The carrier phase recovery system of claim 27 wherein the fine carrier phase estimation circuit is configured to remove a modulated signal from a carrier to produce the recovered phase.
35. (Original) The carrier phase recovery system of claim 34 wherein the fine carrier phase estimation circuit comprises a data-aided decision-directed apparatus to remove the modulated signal from the carrier.
36. (Original) The carrier phase recovery system of claim 35 wherein the fine carrier phase estimation circuit comprises an averaging circuit coupled to the data-aided decision-directed apparatus to reduce noise in the carrier.
- 37.-41. (Canceled)

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42. (Original) A carrier phase recovery system for use in a multiple-link hopping and burst adaptive modem in steady state operation, the carrier phase recovery system comprising:

- a memory;
- a fixed equalizer for pre-compensating amplitude and phase variations of a present data burst of a present link through the fixed equalizer for which the tap coefficients pertinent to a previous burst of the present link are loaded from the memory, the fixed equalizer producing a pre-compensated amplitude and phase signal;
- a carrier phase recovery unit extracting distorted carrier phase for a plurality of communication links, the carrier phase unit including:
  - a first stage which acquires a coarse estimate of the distorted carrier phase using a pilot-aided technique using multiple known pilot symbols contained in the present burst of data;
  - a fixed phase bias removal stage coupled to the first stage;
  - a complex conjugate phasor generating stage coupled to the fixed phase bias removal stage;
  - a de-rotating means for de-rotating the equalized signal by a phasor signal generated by the phasor generating stage to remove estimated coarse carrier phase from the equalized signal to produce a coarse phase compensated signal;
  - a data-aided phase estimator stage for removing modulated signal from the coarse phase compensated signal using a data-aided, decision-directed technique;
  - an averaging means for averaging M symbols from the data-aided phase estimator stage to reduce noise variance; and
  - an adaptive equalizer stage for generating the tap coefficients and storing the tap coefficients in the memory.

43. (Canceled)